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# Homemade BREAD CAKES and PASTRY

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FARMERS' BULLETIN No. 1775  
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# Homemade Bread, Cake, and Pastry<sup>1</sup>

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SOME KIND of bread is served on the average American table three times a day, and cakes and pastries appear often. The kind and quality of these baked goods is therefore important from several viewpoints. Their food value, as with all other foods, depends upon the materials of which they are made. Their palatability depends not only upon materials but upon methods of mixing and baking.

This bulletin is planned as a guide for baking at home the typical yeast and quick breads and the usual types of pastry and cake. Through the discussion of materials, it also offers help in the choice of commercial baked products, and the score cards are designed for use in judging home-baked products at fairs and community demonstrations. Ways of using corn meal are given in another bulletin issued by the Department.

## WHEAT FLOURS

The basic ingredient of bread, pastry, and most cakes is flour, which is finely ground grain; or meal, which is grain more coarsely ground. The flour most widely used is made from wheat—either from the inner part of the grain, which makes white flour, or from the whole grain, which goes into whole-wheat flour.

Wheat makes the best flour for most purposes because it contains proteins that combine in the presence of moisture to form gluten, which gives to wheat doughs and batters a texture and character unlike any other bread mixtures. The gluten itself is the grayish-yellow gummy substance that is left when the starch is washed out of wheat flour. The elasticity of dough is due to gluten, which expands and holds the gas bubbles given off as yeast ferments in the dough, or as baking powder or soda and acid react when liquid is stirred into the dry ingredients of a quick bread.

## STRONG AND WEAK FLOURS

The bread-making value of different types of wheat flour depends on the quantity and the quality of the gluten that can be developed in them. Flours are called "strong" if they have a comparatively large quantity and good quality of gluten, and "weak" if their gluten is low in quantity or poor in baking quality.

The nature and the amount of gluten in flour depend both on the kind of wheat from which the flour is made and on the milling. The wheats which make the strongest flours are grown mostly in the region between the Rocky Mountains and the Mississippi Valley, chiefly north and west of Missouri. The wheats grown in the more humid areas between the Great Plains and the Atlantic coast and most of the wheats of the Pacific coast are softer and less glutenous.

<sup>1</sup> This bulletin is a revision of and supersedes Farmers' Bulletin 1450, Home Baking.

The housekeeper wants flour to suit her particular purposes—that is, for bread, for pastry, or for cake. For bread, a strong flour is preferred, one that contains more gluten and less starch than other flours. Cake and pastry flours are weak flours milled from soft wheat. All-purpose flours, as the term indicates, contain a moderate amount of gluten, giving them a strength between that of the typical bread and the typical cake flours. All-purpose flours are usually made by blending wheats or flours selected to produce the characteristics desirable for most kinds of baking.

It is difficult, however, for a housekeeper to tell what type of flour she is buying, especially as those on the market vary all the way from very strong to very weak. The flours from soft wheat have a velvety texture and those from hard wheat are usually more gritty, but it requires some experience and a fine sense of touch to detect this difference. Experts usually do it by taking a pinch of flour and rubbing it lightly between the thumb and finger. Another way to tell is by squeezing a handful tightly and noticing whether as the hand is opened the flour remains in a mold and shows the impression of the fingers. In this test a hard-wheat flour acts more like a powder and the mold breaks up more readily than a soft-wheat flour.

It is much easier to get good results in baking if methods are adapted to the type of flour. When occasion demands, good yeast bread can be made from a comparatively weak flour or good cake from a strong one, by making sufficient allowance. Rules for substituting typical hard-wheat and typical soft-wheat flours are given on page 14.

### STRAIGHT AND PATENT FLOURS

Out of any lot of wheat, either hard or soft, it is possible to mill several kinds of flour that differ considerably in their bread-making quality. The present milling process is very complicated and highly specialized. The grain is broken up gradually as it is passed between several pairs of rolls, and after each step some separation is made according to the size and character of the particles. In this process the bran and the germ are usually removed.

The flour resulting from each separation forms a "stream." These streams are combined in various ways to form different commercial grades of flour. The grade most commonly sold to the housewife is called a "patent" flour.

"Straight" flour is approximately 70 percent of the total weight of wheat milled, the remainder being byproducts known as bran, germ, and shorts.

The chief difference between patent and straight flours lies in the fact that certain streams of flour which go into the straight are excluded from the patent and utilized in producing so-called "clear" flours. Patents are classed as long and short patents, depending on what proportion they represent of the total flour milled from the grain. A short patent may contain less than 50 percent of the total flour and is seldom made except for commercial bakers. A longer patent containing a larger proportion of the total flour is more common on the retail market, except for cake flours, for which a short patent is generally used.

### FOOD VALUE OF WHEAT FLOURS

Of the minerals and vitamins of wheat—especially the iron, vitamin B, and vitamin G—the greater part are contained in the bran and germ, which are removed in the milling of white flour. Whole-wheat, or graham, flour contains all the constituents of wheat in their natural proportions. Its baking strength, however, is less than white flour, and it does not keep so well.

In a diet that is limited in variety, and hence likely to be lacking in certain minerals and vitamins, some of the bread should be made from whole-wheat flour. In a diet containing plenty of milk, eggs, fruits, and vegetables, the bran

and germ of the wheat kernel are not so essential, but breads made from whole-wheat flour add flavor and variety.

Bran, the dark fibrous portion of the wheat, is less completely digested than the rest of the kernel. As sold commercially, bran derives some food value from the starch as well as from the minerals and vitamins associated with the fibrous parts, but it is used chiefly for its laxative properties. In moderate quantities, and especially when ground up in whole-wheat flour, bran is usually considered a desirable addition to the diet.

The average proximate composition of different types of hard-wheat and soft-wheat flours is shown in table 1. Though no indication of vitamin content can be given in such a table, experiments have shown that in general the highly refined flours contain practically none of the vitamins present in the whole-grain products.

TABLE 1.—Average proximate composition of different types of wheat and wheat flour<sup>1</sup>

Type of wheat and flour	Carbohydrates (mostly starch)	Fat	Protein	Water	Mineral matter (ash)	Type of wheat and flour	Carbohydrates (mostly starch)	Fat	Protein	Water	Mineral matter (ash)
	Per cent	Per cent	Per cent	Per cent	Per cent		Per cent	Per cent	Per cent	Per cent	Per cent
Hard wheat:						Soft wheat:					
Grain.....	70.9	1.8	12.3	13.2	1.8	Grain.....	72.2	1.9	11.0	13.2	1.7
Whole-wheat flour.....	70.9	1.8	12.3	13.2	1.8	Whole-wheat flour.....	72.2	1.9	11.0	13.2	1.7
Straight flour....	73.7	1.1	11.5	13.2	.5	Straight flour....	75.8	1.2	9.4	13.2	.4
Patent flour.....	74.6	1.0	10.8	13.2	.4	Patent flour.....	76.7	1.1	8.7	13.2	.3

<sup>1</sup> Calculated on 13.2 percent moisture basis for purposes of comparison.

## RYE FLOURS

In bread-making qualities, rye approaches wheat more nearly than does any other grain, and is in fact the only grain that can be used alone successfully in yeast breads. The proteins of rye are similar to, though not identical with, those of wheat, and in food value the two grains are about the same. But rye flour makes a more sticky and less elastic dough than wheat flour.

Rye flour is marketed in four general grades—dark, light, medium, and straight. The dark flour includes some of the outer part of the grain; the light flour, the inner part or endosperm; and the medium grade is usually a blend of the dark and the light. The straight grade is all the flour produced in the milling of rye, and normally consists of about 30 percent dark flour and 70 percent light flour. Ordinarily the medium- and straight-grade flours can be used interchangeably.

## BEAN FLOURS

Bean flours are made by grinding dry beans, either whole or with the seed coat removed, and contain more protein than do the grain flours. But the proteins are different from those of wheat and rye, and bean breads are made by combining bean flour with wheat flour in proportions of about 4 or 5 of wheat to 1 of bean flour. This is done to avoid too much bean flavor and to get the benefit of the gluten in the wheat.

Soybean flour contains more protein, but less starch than do wheat, rye, or other bean flours. The soybean proteins are more "efficient", that is, of higher nutritive quality than the proteins of other beans. Much of the soybean flour on the market is made of the whole or hull-free beans. Some of it, however, is made from the bean press cake, after the oil has been expressed for other

purposes. A very small quantity has the fat extracted by means of a chemical solvent. In the last case the flour contains much less fat than other bean flours and is used in smaller quantities in combination with wheat flour.

All the bean flours are good sources of vitamin B and rich in calcium and iron.

## MEASUREMENTS

Flours, except whole wheat, should always be sifted once before measuring and then dipped lightly into the measure and leveled. If they are packed into the measure, too much will be used. Whole-wheat flour and meals should be stirred to lighten them; then they may be measured as other flours.

Fats should be packed solid into the measure, without air spaces. This can be done more easily if the fats are brought to room temperature before measuring. Level off the top of the measure. In measuring less than one-fourth of a cup of hard fat it is best to use tablespoons (one-fourth cup equals 4 tablespoons).

Sugar is measured in the same way as flour, except that it need not be sifted.

Equivalent measurements:

3 teaspoons = 1 tablespoon.

16 tablespoons = 1 cup (standard).

4 cups = 1 quart.

In the following recipes all quantities are given in terms of level measurements. A table knife or other straight edge should be used to level flour, sugar, salt, and other dry ingredients. Accurate measurement or weighing of ingredients is essential if a satisfactory product is to be obtained.

## YEAST BREADS

Yeast breads are made of wheat or rye flour, or of mixtures of wheat flour with rye flour or meal, oatmeal, or bean flours. Salt-rising bread also is included in the present discussion because the leavening, although not yeast, is a living organism, as distinguished from a chemical leavening such as baking powder.

## INGREDIENTS

The essential ingredients in bread are flour, liquid, salt, and leavening. It is customary also to use sugar and fat.

A strong flour is preferred for a homemade loaf of "light" bread, though all-purpose flours and comparatively weak flours may be used successfully if the procedure is adapted to the type of flour. Whole-wheat bread may be made entirely of whole-wheat flour, but a mixture of white flour and whole wheat makes a lighter but less flavorful loaf than whole-wheat flour alone. Whole-wheat flour does not make as light a loaf as white flour.

In the United States other yeast breads, made with rye or bean flours, usually contain wheat flour also to make the loaf lighter and to modify the flavor.

Any one of the forms of milk—whole or skim fresh milk or evaporated or dried milk—may be used as the liquid in bread to improve the quality and add to the food value. If whole milk or potato water is used the bread does not become stale so rapidly or dry out so fast as when water is the only liquid.

The fat in dough makes the bread more tender, increases its keeping qualities, and adds to its fuel value. Butter is sometimes used, but lard or any other good cooking fat is satisfactory.

A small quantity of sugar added to the dough makes it rise more quickly and helps to give a golden-brown color to the crust. Some persons think that the flavor also is better when sugar is used.

Salt is added for flavor. The yeast grows faster in bread dough when only a small quantity of salt is used, but there should be enough salt to bring out the wheat flavor.

Yeast, the minute cell-like plants put into the dough to leaven it, may be bought in dry or compressed cakes, or may be grown at home in the form of a starter, or liquid yeast. The dry cakes keep better than the other forms; but since the yeast plants are not growing actively, longer time is required to make bread with dried yeast. The compressed yeast is the most convenient to use if it can be obtained fresh. It is usually more expensive than the other forms, however, and spoils rather quickly. Many housekeepers therefore still prefer to keep home-grown or liquid yeast on hand.

### FERMENTATION

When yeast is added to dough fermentation begins. Enzymes in the flour change some of the starch of the flour to sugar, and enzymes in the yeast change the sugars to carbon dioxide gas and alcohol. The tiny bubbles of carbon dioxide leaven the dough, and the alcohol evaporates during the baking. The enzymes and the acids resulting from fermentation also change the gluten and give it a softer and more elastic texture. The latter fact is one of the reasons why dough made with soft-wheat flour must be handled somewhat differently from that in which hard-wheat flour is used.

For this reason also, flour should not be kneaded into the dough after fermentation has progressed, or streaks of the unchanged flour will appear in the bread.

Like all living things, yeast needs a favorable temperature as well as moisture and food in order to grow vigorously. The best temperature for bread fermentation is probably between 80° and 85° F. Yeast grows faster at temperatures even slightly above 85°, but when the dough gets warmer than this the conditions become more favorable to the growth of other less desirable organisms that may be present. If the temperature of the dough goes much over 95° the growth of the yeast may be retarded.

In order to keep the dough at a constant temperature of about 82° F. the bread bowl or pan may be covered and set in water. Ordinarily, when the temperature of the room is much lower than 80°, the water in the outer pan should be about 90° or 95°. In hot weather, when the air is warmer than 85°, the water should be slightly under that temperature. When a sponge or starter (p. 8) is allowed to stand overnight, it should be well protected against drafts and placed where it will be neither chilled nor overheated.

Since temperature is so important in bread making, the use of a thermometer is helpful. Experienced bread makers can often tell by the feeling when the temperature is right, but this method is not entirely dependable. A thermometer is not expensive and is an accurate guide.

The rising of the dough should be stopped at the right point. If the dough is allowed to stand too long before it is "punched down", an unpleasant or sour flavor may develop, and the gluten will be injured. If the dough rises too high in the pan before it is put in the oven, the bread will be too coarse-grained; and if the dough does not rise high enough, the bread will be heavy.

The proper length of time for dough to rise depends on the vitality of the yeast, the temperature at which the dough is held, and the strength of the gluten. Volume, appearance, and feel all indicate when the dough has risen long enough. The best test is to touch the surface of the dough lightly with the finger. If the dough has risen enough, a slight depression will remain on the surface. If the dough is still so elastic that the depression disappears quickly, it should rise a little longer. Dough made with very strong flour will reach



about two and one-half times its original volume before this test is obtained, but dough made with rather weak flour will give the same test when about double its original volume.

### PROPORTIONS FOR WHITE BREAD

Ingredients in the following proportions will make about  $3\frac{1}{2}$  pounds of bread. The liquid may be milk, water, potato water, or any combination of these.

$2\frac{3}{4}$ cups liquid.	2 tablespoons fat.
$\frac{1}{2}$ to 1 ounce (1 to 2 cakes) yeast.	About $2\frac{1}{4}$ pounds, or $2\frac{1}{4}$ quarts, sifted
3 tablespoons sugar.	hard-wheat flour.
4 teaspoons salt.	

From these ingredients bread may be made by various methods. The common standard ways, known as the straight-dough and sponge methods, are described here, and suggestions are given for varying them.

### STRAIGHT-DOUGH METHOD

With the ingredients in these proportions and with the temperature about  $82^{\circ}$  F., bread can be made according to the straight-dough method with compressed yeast in about 4 hours from the time the dough is mixed until the loaves are put into the oven. If the time must be shortened, twice or even three times as much yeast may be used. The dough must then, of course, be watched very closely, as there is more danger of letting the fermentation go too far.

**Mixing.**—A small quantity of the liquid, about one-half cup, should be set aside for softening the yeast. If milk is used, it must be scalded first to check the growth of bacteria, and then cooled. In this case the part reserved for soaking the yeast should be cooled quickly, and the rest while still hot may be poured over the sugar, salt, and fat.

Other liquids than milk usually do not require heating, but often this is done for convenience in dissolving and melting the sugar, salt, and fat. In any case the liquid mixture should be brought to a temperature below  $100^{\circ}$  F. before being mixed with the yeast. The exact temperature depends on that of the room and of the flour, and should be so adjusted to these as to bring the temperature of the dough to about  $82^{\circ}$ .

The flour, except about 1 cup, should be added to the liquid and mixed thoroughly with a spoon, the hands, or a mechanical bread mixer. All the flour may be added at once if experience has shown the amount necessary. It is impossible, however, to tell beforehand exactly how much flour will be required unless flour from this same lot has already been used. The experienced bread maker tells by the feel of the dough when enough flour has been added. The quantity given in the above proportions is about right for rather strong flour. If the flour is extremely strong,  $2\frac{1}{4}$  pounds will be too much, but if it is of only average strength more will be needed. Usually, with a strong flour, the dough should be about as soft as can be conveniently handled. The quantity of flour varies also with the kind of liquid used. More flour is required with water than with milk because the milk contains some solids.

With a new lot of flour it is a good plan to measure the quantity used and note the way it acts. If results are satisfactory, the same methods and measurements may be repeated as long as that flour lasts.

**Kneading.**—When the flour and liquid are thoroughly mixed and the dough no longer sticks to the sides of the mixing bowl, it is ready to be kneaded. The main purpose of the kneading is to develop the gluten. This first kneading should be thorough, but heavy pressure is not needed. If a bread mixer is used, it kneads as well as mixes.

If the bread is kneaded by hand, it should be turned out on a clean floured board and worked quickly with the palms of the hands until it is soft, smooth, and elastic. Since the dough is sticky at first there may be a tendency to knead in the flour on the board. Therefore only a thin film of flour should be used on the board, for as the gluten develops in the dough the stickiness disappears.

Dough made from hard-wheat flour requires more kneading than that made from soft-wheat flour. Overkneading of doughs from either flour may, however, injure the baking quality of the gluten and produce a loaf of poor texture and volume.

**First rising.**—After kneading, the dough should be formed into a ball and put into a greased bowl to rise. The easiest way to keep the surface from drying and cracking is to turn the dough over once or twice in the bowl so that the whole surface is thinly greased. Fat should be used sparingly, however, so that no streaks of it will show later in the bread. A clean cloth over the bowl and a plate or other tight cover will help to control the temperature, to keep out the dust, and to prevent drying. The bowl may be placed in a pan of warm water to raise the temperature of the dough, if it has cooled off, and keep it between 80° and 85° F. When the dough has risen to about double its original bulk, it should be tested with the finger to determine whether it is ready to punch down for a second rising.

**Punching down.**—When the dough is light enough, the center should be punched in, the sides pulled over and pressed into the center, and the ball of dough turned with the smooth side up. This can be done in less than a minute and is preferable to taking the dough out on the board. The purpose of punching down is to let out some of the gas so that fermentation can continue without injuring the gluten by causing it to stretch too far.

**Second rising.**—The second rising is not used with soft-wheat flour, but with hard-wheat flour will not take so long as the first if the temperature is right. It helps to give a good texture and fine, even grain. When the dough has again risen to the same volume as before, it is ready to be punched down and divided.

**Dividing.**—The dough should be so divided that each piece when placed in the baking pan will fill it about half full. After being divided, the dough should be rounded into balls to seal over the cut surfaces and allowed to stand a few minutes before molding.

**Molding.**—The loaves are molded by flattening each of them on the board into an oblong piece and then folding and sealing the edges together with the palms of the hands. This is repeated several times, each time folding a different way. The last time the sides are brought together into the center and the loaf is placed, sealed edges down, in a greased pan for the last rising. The top surface should be lightly greased to prevent drying out and to keep the surface elastic. Otherwise a compact grain will form below the crust.

**Rising in the pans.**—The shape of the pan makes a difference in the volume and quality of the loaf. A shallow pan (about 4 by 8½ by 3 inches) that holds a pound or a pound-and-a-half loaf is better than a deep, narrow pan. The loaf bakes more quickly, has a crust on all sides, and makes a more attractive slice if baked singly in such a pan. The material of the pan affects the temperature of baking. Glass and enamelware require lower temperatures than such metals as tin and aluminum.

The temperature (80° to 85°F.) should be just as carefully regulated during the last rising as for the two earlier periods. The pans may be set in warm water and covered with a clean cloth. When the loaves have about doubled in bulk the surface should be lightly pressed with the finger to test whether they are ready to be baked (p. 5).

**Baking.**—The oven should be moderately hot at first (about 385° F.) for a pound loaf. It can be baked at a higher temperature and more quickly than a pound-and-a-half loaf. Unless the oven bakes very evenly, the loaves should be turned around after they have been in about 15 minutes. The temperature of the oven should then be lowered to 350°. If a coal or wood range is used, the temperature at the start should be 400° or lower.

Baking will require from 45 minutes to 1 hour, depending on the temperature of the oven and the size of the loaf. When the loaves shrink from the sides of the pan and give a hollow sound when tapped, the bread is done. Brushing the loaves with milk or butter just before they are taken from the oven oftentimes improves the color of the crusts and makes them glossy and more tender, but less crisp. As soon as the loaves are taken from the oven they should be turned out of the pans and placed on a rack to cool. They should not be covered while they are warm.

### SPONGE METHOD

With dried yeast, which takes longer to become active than compressed yeast, it is generally more satisfactory to make a sponge early in the morning or the night before the bread is to be baked. With the following exceptions, the dough is mixed and handled in the same way as in the straight-dough method with compressed yeast.

The dried yeast cake should be broken up and soaked in lukewarm water until it is soft, or for about one-half hour before mixing.

If the sponge is to stand overnight, only about half as much yeast as called for in the proportions on page 6 is needed.

The liquid, the yeast, and half of the flour should be mixed and left until they form a light, frothy sponge. For a quick sponge the sugar also may be mixed with these other ingredients.

When the sponge is to rise overnight, ordinary room temperature (65° to 75° F.) is warm enough; but for a shorter sponge process the temperature should be the same as for dough (80° to 85°). When the sponge is light, it should be stirred up well. The salt, sugar, melted fat, and the rest of the flour are then added to make a dough.

After the dough is mixed it is handled in the same way as in the straight-dough method.

### BREAD FROM SOFT-WHEAT FLOURS

Soft-wheat flours, because of the smaller quantity or poorer quality of the gluten, require less moisture than hard-wheat flours to make a dough of the right consistency. Therefore proportionately less liquid or more flour is used, since the dough is made a little stiffer. It will not "tighten up" during the first rising, as does hard-wheat flour dough. Instead it may become softer or slacken a little. The proportions for bread made with hard-wheat flour (p. 6) are based on 2¾ cups of liquid and 2¼ pounds, or 2¼ quarts, of flour. For the same quantity of liquid about 2½ pounds, or 2¾ quarts, of sifted soft-wheat flour will be required.

Doughs made from soft-wheat flours rise more quickly than those made from the harder wheat flours partly because, having less elasticity, they do not offer so much resistance to the gas bubbles formed by the yeast.

The quality of bread made from soft-wheat flour seems to be improved by using a comparatively large proportion of yeast and sugar to hasten the fermentation. If this dough is fermented for too long a period, the gluten is weakened. The proportions that seem to give the best results with soft-wheat flour are one yeast cake (one-half ounce) and 1 tablespoon of sugar for every pound loaf of bread. This is about double the quantity of each given in the standard proportions for bread made with hard-wheat flour.

Soft-wheat flour doughs will not stand so much handling as those made with hard-wheat flour. If they are kneaded too hard or too long the gluten is injured.

Dough made from weak flour will not rise so high usually as dough made from flour that has strong gluten. The fermentation of any dough should be checked before the gluten has reached the limit of its stretching power. Soft-wheat flour doughs usually reach this limit when they have about doubled their original bulk. With a rather weak flour, the dough should be watched closely and tested with the finger before it has quite doubled in volume (p. 5).

### HOME-GROWN OR LIQUID YEASTS

One way to avoid the expense of using large quantities of compressed yeast, especially with soft-wheat flours, is to keep some kind of starter from one baking to the next. Such a mixture is called sponge, ferment, starter, or liquid yeast, and is usually made from yeast, sugar, salt, water, and either potato or flour or both.

The following method of making liquid yeast with potato has proved particularly successful with soft-wheat flours:

3 potatoes ( $\frac{3}{4}$  pound).  
 $1\frac{1}{4}$  cups boiling water.  
 4 tablespoons sugar.  
 $1\frac{1}{2}$  tablespoons salt.

About  $1\frac{1}{2}$  cups cold water.  
 1 cup starter, or 1 cake yeast ( $\frac{1}{2}$  ounce) in 1 cup water.

Use good, sound, clean potatoes. Pare and cut them into small pieces, and cook until tender in the boiling water. Mash the potatoes in the water in which they were cooked. Add the sugar, salt, and enough cold water to make  $3\frac{1}{4}$  cups of liquid, and allow this mixture to become lukewarm (about  $82^{\circ}$  F.). Add 1 cup of the starter reserved from the last baking. If none of this starter is available, one cake of dried or compressed yeast soaked in 1 cup of lukewarm water may be used instead. Allow this mixture to stand overnight. In the morning it should be light and frothy, and is then ready to use. Stir it well. Pour off 1 cup to save as a starter for the next baking, and store it in a clean, scalded, loosely covered jar in a cool place. In very cold weather it must be protected from freezing.

The following directions are for making bread from liquid yeast with soft-wheat flour:

$3\frac{1}{4}$  cups liquid yeast.  
 3 tablespoons fat.  
 5 tablespoons sugar.

About  $2\frac{3}{4}$  pounds, or 3 quarts, sifted soft-wheat flour.

Set the yeast for about half an hour in a pan of water of the right temperature to bring it to about  $82^{\circ}$  F. Add the fat and sugar and gradually stir in the flour. The exact quantity of flour required for a given quantity of liquid differs, of course, according to the absorption of the flour. The dough should be rather stiff, and should be handled according to the general directions for soft-wheat flour yeast bread (p. 8).

If bread is baked twice a week or oftener and the starter is cared for properly, there should be no trouble with spoilage. With bakings less often, the starter should be renewed by making up a new mixture, as described, at least once a week; or, if the weather is hot and no cool storage place is available, as often as twice a week. If the mixture should by any chance develop any unusual appearance or odor, it should be discarded and new starter made with clean materials and scalded utensils.

### ROLLS

Yeast rolls are made by the same general method as loaf bread. They usually contain more sugar and fat and sometimes egg, and milk is almost always used as the liquid.

### Parker House Rolls

1 cup milk.  
1 cake ( $\frac{1}{2}$  ounce) yeast.  
1 tablespoon sugar.  
 $\frac{1}{2}$  teaspoons salt.

$1\frac{1}{2}$  tablespoons butter or other fat.  
About  $3\frac{3}{4}$  cups sifted hard-wheat flour, or 4 cups sifted soft-wheat flour.

These ingredients make 16 rolls.

The straight-dough method is perhaps the most convenient when only rolls are made. Allow the dough to rise the first time in the same way as for loaf bread. It may be permitted to rise again before it is rolled and cut into biscuits, or the second rising may be omitted. Roll the dough out thin and cut with a biscuit cutter, or cut off small pieces, roll them into balls, and flatten with the palms of the hands. Brush the top lightly with butter, crease through the center with the handle of a table knife, fold over, and press down the top. Brush the top with butter if a soft crust is desired. When the rolls have doubled in bulk bake them quickly in a hot oven ( $425^{\circ}$  F.) for 10 or 15 minutes.

After the rolls are molded and placed in the pan, they may be put in a refrigerator or other cold place to slow down the action of the yeast, and baked later. If the temperature has been so low that the rising is very much checked, they should be kept in a warm place for a little while before being baked so that the volume will be about doubled.

Dough for rolls made in a quantity that can be stored in a refrigerator and used over a period of several days generally contains more sugar. The following recipe is richer than the Parker House rolls in that it contains more fat.

### Refrigerator Rolls

1 cake ( $\frac{1}{2}$  ounce) yeast.  
 $\frac{1}{4}$  cup lukewarm water.  
 $\frac{5}{8}$  cup fat.  
 $\frac{1}{2}$  cup sugar.

2 cups scalded milk.  
1 pound 15 ounces (8 cups) sifted all-purpose flour.  
2 teaspoons salt.

Soften the yeast in the lukewarm water. Add the fat and sugar to the hot milk, cool, and combine with the yeast and water. Stir in the sifted flour and salt until the dough is stiff enough to knead. Follow the straight-dough method for making bread. At the end of the second kneading, cut off as much as needed, shape as desired, and put in a warm place to double in bulk, then bake in a hot oven ( $400^{\circ}$  F.) for 15 to 20 minutes. Grease the surface of the remaining dough, cover, and put in the refrigerator. This dough can be kept satisfactorily for rolls for at least a week.

Increased color and flavor may be obtained by the addition of an egg. If egg is added reduce the fat to one-half cup.

### WHOLE-WHEAT BREAD

Whole-wheat flour has less baking strength than white flour, and for that reason must be handled somewhat differently. The dough ferments more quickly, is softer and more moist. Whole-wheat flour from hard wheat will make a good bread without the addition of any white flour, but whole-wheat flour from soft wheat, unless the bread is made with great skill, requires some white flour with it to make the bread light.

$2\frac{1}{2}$  cups liquid.  
1 to 2 cakes compressed yeast.  
4 tablespoons brown sugar.  
3 teaspoons salt.

3 tablespoons fat.  
1 pound 13 ounces (7 cups) hard whole-wheat flour, or  $7\frac{1}{2}$  cups soft whole-wheat flour.

Stir the flour to lighten it, but do not sift it, then measure as if it were white flour and proceed according to the directions for white bread (p. 6). These ingredients make 3 pounds of bread.

## WHEAT-BREAD VARIATIONS

A variety of breads may be made by adding to white-bread dough some flavorful food such as raisins or other dried fruits, nuts, or cheese. Fruit bread has unusual keeping qualities and nut and cheese breads are especially good toasted or in sandwiches.

## Raisin or Other Fruit Bread

2 $\frac{3}{4}$ cups liquid.	2 tablespoons fat.
1 to 2 cakes compressed yeast.	2 pounds 14 ounces (12 cups) sifted all-purpose flour.
6 tablespoons sugar.	
4 teaspoons salt.	1 $\frac{1}{2}$ cups raisins soaked, drained, and chopped.

Follow the same method as for white bread, and add the fruit at the first mixing. Bake for 15 minutes in a moderately hot oven (380° F.); then reduce the oven to moderate heat (350° F.).

Any dried fruits—figs, prunes, dates, or apricots as well as raisins—may be used. Or, if preferred, use three-fourths of a cup each of fruit and nuts combined.

## Nut and Cheese Breads

For nut bread, add 2 cups of chopped nuts (pecans, walnuts, peanuts, hickory nuts, as desired) to the first mix of the white-bread dough (p. 6) and increase the sugar to 6 tablespoons.

For coconut bread, add 1 $\frac{1}{2}$  cups of shredded coconut and increase the sugar to 6 tablespoons.

For peanut-butter bread, add 1 $\frac{1}{2}$  cups of peanut butter and increase the sugar to 6 tablespoons.

For cheese bread, add 2 cups of grated cheese, but do not increase the sugar.

To increase the milk solids not fat in bread, add to the white bread recipe 1 $\frac{1}{2}$  cups (6 $\frac{1}{2}$  ounces) of dried skim milk sifted with the flour and use water for the liquid.

## Salt-Rising Bread

Salt-rising bread is discussed here as a variation of wheat bread, but it is not a yeast bread. The home bread maker obtains her starter from corn meal, which contains bacteria that cause the necessary fermentation. The special cultures of this micro-organism used by bakers produce salt-rising bread of more uniform quality than can be expected with home-grown sponge. Salt-rising bread is never so light as bread raised with yeast, and is more moist and crumbly. The temperature used for the sponge and dough is higher than that for yeast bread.

For 3 $\frac{1}{4}$  pounds of salt-rising bread make a starter of the following ingredients:

1 cup milk.	7 tablespoons corn meal, preferably white.
1 tablespoon sugar.	1 teaspoon salt.

Scald the milk and stir in the sugar, corn meal, and salt. Put this in a clean covered jar and place in a bath of water as hot as the hand can bear. Keep this mixture in a warm place (115° F.) from 6 to 7 hours, or until it shows fermentation. The gas can be heard to escape when it has fermented sufficiently.

To this mixture add:

7 $\frac{3}{4}$ ounces (2 cups) all-purpose flour.	2 tablespoons sugar.
2 cups lukewarm water (100° F.).	3 tablespoons melted fat.

Beat this sponge thoroughly, put the jar into the warm water bath (115° F.), and let rise until the sponge is very light and full of bubbles.

To this sponge add 2 pounds 1 ounce (8 $\frac{1}{2}$  cups) sifted all-purpose flour, which will give a stiff dough. Knead for 10 or 15 minutes, cut, mold into loaves, place

in greased pans, and allow to rise until two and one-half times the original bulk. Bake for about 35 minutes in a moderately hot oven (385° F.) for 10 minutes, then lower to 350° to finish.

### RYE, OATMEAL, AND BEAN BREADS

Flours or meals from other grains and from beans are sometimes used with wheat flour for making bread. Bread made entirely from rye flour or meal is fine-grained but moist and heavy in comparison with wheat bread, and in the United States the lighter wheat and rye loaf is usually preferred. Oatmeal bread has a coarser grain than wheat bread. The bean-flour breads are slightly heavier and darker in color.

#### Rye Bread

1½ pounds (6⅓ cups) sifted straight-grade rye flour.	1¼ pounds (5½ cups) sifted all-purpose flour.
1½ pounds (4⅔ cups) sifted hard-wheat flour.	3 cups lukewarm water.
or	1 to 2 cakes compressed yeast.
1¼ pounds (7 cups) sifted straight-grade rye flour.	3 tablespoons sugar.
	5 teaspoons salt.
	2 tablespoons melted fat.

Sift the rye flour with the white flour and proceed as for white bread (p. 6) until ready to form the loaves. Mold into long, sharply pointed loaves, place on a greased shallow pan or one on which flour or corn meal has been sprinkled. Rub fat lightly on the tops of the loaves. Cover and let rise until the bulk has increased one and three-quarters times its bulk (about 30 to 45 minutes). Make about three slashes with a sharp knife at an angle across the top of each loaf. Bake pound loaves for 30 to 35 minutes in a hot oven (400° F.). A pan of hot water should be placed in the oven during baking.

Remove loaves from pan and glaze with a mixture of egg white and water or cooked starch paste.

#### Oatmeal Bread

3 cups finely ground rolled oats.	1 to 2 cakes compressed yeast.
2 pounds 3 ounces (9 cups) sifted all-purpose flour.	4 tablespoons sugar.
3½ cups milk.	4 teaspoons salt.
	2 tablespoons fat.

Mix the rolled oats with the white flour and proceed as for white bread (p. 6). These ingredients make 4 pounds of bread.

#### Soybean Bread

10 ounces (4½ cups) sifted soybean flour.	1 to 2 cakes compressed yeast.
2 pounds 1 ounce (8½ cups) sifted all-purpose flour.	4 tablespoons sugar.
2¾ cups milk.	4 teaspoons salt.
	2 tablespoons fat.

Sift the soybean flour with the wheat flour and proceed as for white bread (p. 6). These ingredients make 4½ pounds of bread.

#### Lima Bean Bread

9 ounces (2 cups) sifted lima bean flour.	1 to 2 cakes compressed yeast.
2 pounds 1 ounce (8½ cups) sifted all-purpose flour.	2 tablespoons sugar.
3 cups milk.	4 teaspoons salt.
	2 tablespoons fat.

Sift the lima bean flour with the white flour and proceed as for white bread (p. 6). These ingredients make 4½ pounds of bread.

### SPOILAGE IN BREAD

There are three principal kinds of spoilage in bread—sourness, ropiness, and mold.

Sourness or high acidity in bread results from abnormal fermentation due to the growth of lactic acid bacteria in the dough for too long a period before baking. To prevent this the rising of the dough must be stopped at the right point.

Ropiness or sliminess in bread shows itself in the center of the loaf, sometime after the bread is baked. It results from the growth of certain highly resistant spore-forming bacteria. In summer, when bread is stored at relatively high temperatures, this type of fermentation may cause considerable waste. The organisms causing ropiness seem to be present in some cases in the flour, but they also may be in potatoes, or in liquid yeast that is saved from one baking to another, or on utensils.

To prevent ropiness, be sure that the utensils are not carrying the infection. Cracks or seams harbor bacteria and make them difficult to destroy. Boil the utensils in water and vinegar combined in the proportion of 1 part of vinegar to 3 parts of water. If the bread continues to be ropy and potatoes are being used, omit them from the next baking. If liquid yeast is being saved from one baking to another, discard it and make fresh yeast. If these precautions are not successful, add about 2 teaspoons of 90-grain white vinegar to the liquid ingredients for an average baking of  $3\frac{1}{2}$  pounds of dough.

Mold spores that may be present in bread dough are killed by the heat of baking. But mold spores in the air may contaminate the surface of the bread while it is cooling and cause trouble later if conditions favor their growth. The most effective preventive of mold is storage of the bread in a cool, dry place.

To keep bread in the best condition store it when thoroughly cool in a clean, well-aired, covered, ventilated container, and keep in a cool place. Wash the container at frequent intervals in hot soapsuds, rinse with boiling water, and dry thoroughly, preferably in the sun or in an oven. Any spoiled bread should be disposed of as soon as discovered and the bread container washed, scalded, and sunned thoroughly to prevent the infection of fresh bread.

### QUICK BREADS AND PASTRY

Quick breads are so-called because they are made with leavening that acts more quickly than yeast. The other essential ingredients are the same as for yeast breads—flour, fat, and liquid. Salt is added for seasoning, often sugar also, and many quick breads contain eggs.

With a few exceptions, such as pop-overs, which are raised by steam, quick breads require baking powder or other chemical leavening agent. Pastry such as piecrust has no leavening added. Air may be beaten into a batter, but generally is added by means of beaten eggs. Though the air alone does not expand enough to leaven a mixture, it helps to make it light before baking, and its expansion supplements the effect of the chemical agent and the water vapor formed during the heating. Steam is formed only when the water in the batter or dough reaches the boiling point.

### INGREDIENTS AND PROPORTIONS

The fundamental proportions of ingredients for the chief types of quick breads and pastry are given in table 2. These proportions may be varied somewhat to meet individual tastes, but in general the relations between the various ingredients should be kept as indicated. The important differences in flours, liquids, leavening agents, and other ingredients are pointed out so that substitutions can be made according to the supplies at hand.



TABLE 2.—Ingredients and proportions for quick breads and pastry

Class	Flour, all-purpose	Baking powder	Salt	Sugar	Eggs	Milk	Fat
Pop-overs	Cups 1	Teaspoons	Teaspoon $\frac{1}{8}$	Table-spoons	Number 2	Cup 1	Table-spoon 1
Timbale cases	1		$\frac{1}{2}$		1	$\frac{3}{4}$	Teaspoon 1
Cover batter no. 1	1	$1\frac{1}{2}$	$\frac{1}{2}$		1	$\frac{3}{4}$	1
Cover batter no. 2	$1\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{2}$	2	1	1	1
Fritters	2	3	1	2	2	1	Table-spoons 1
Griiddlecakes	$1\frac{1}{2}$ – $1\frac{3}{4}$	$2$ – $2\frac{1}{2}$	$\frac{3}{4}$	0–1	1	1	2
Waffles	$1\frac{1}{2}$	2	$\frac{1}{2}$	1	1–2	1	2
Muffins	2	3	$\frac{1}{2}$	0–2	1	1	2–4
Biscuits	3	4	1			1	4–6
Pastry, plain	$1\frac{1}{2}$		1			( <sup>1</sup> )	5–6

<sup>1</sup> About  $2\frac{1}{2}$  tablespoons of water.

### Flour

When other flours are used instead of the all-purpose type called for in table 2, the proportions are different. Hard-wheat flour may be substituted on the basis of 1 cup for each cup of all-purpose flour and seven-eighths of a cup for each cup of the softer wheat flours. Finely ground whole-wheat flour may be substituted measure for measure for all-purpose flour. Any of these flours may be substituted weight for weight.

### Liquid

Milk is the best liquid to use in quick breads, cakes, and cookies, for flavor, texture, and food value. Whole milk, skim milk, and dried or evaporated milk, diluted to the proper consistency, give practically the same results. Since skim milk lacks the fat of whole milk, extra fat may be added. In any product except pop-overs, sour milk may be substituted for sweet, cup for cup, provided the rules for leavening agents are followed. In some cases a mixture of milk and water, or even water alone, may be used with no great loss in flavor or texture. In pastry, water is preferable. When cream is used as the liquid, it is not necessary to use so much other fat.

### Fat

Fat, because it is insoluble in the other ingredients in the batter, holds apart the particles of protein, starch, and other substances when liquid is added. By preventing to some extent the cohesion of the ingredients, the fat is said to "shorten" the product. The more fat added, the shorter or more tender the product becomes. Almost any mild-flavored edible fat is satisfactory for use in baked products. In general lard has greater shortening power than the other fats ordinarily used.

Such fats as butter and the margarines contain about 15 percent of water. When they are substituted for lard or similar fats containing no water, about 2 extra tablespoons for each cup of fat called for should be used.

Most of the hydrogenated fats have had air beaten into them to make them more plastic. Therefore, a cup of hydrogenated fat may weigh less than 1 cup of lard or butter. For practical purposes hydrogenated fats may be substituted directly for butter or margarine, but an additional  $1\frac{1}{2}$  tablespoons to each cup should be used when hydrogenated fats are substituted for lard.

When unsalted fats are used to replace butter or margarines, additional salt may be needed.

### Sugar

A standard granulated sugar, either beet or cane, is satisfactory to use for quick breads, but for cakes the finer granulations give a better product. Powdered sugar, however, is not desirable. Brown sugar may be used if the flavor is desired. When brown sugar is measured it should be rolled and sifted, if lumpy, and then packed loosely in the cup. It should keep the shape of the cup when turned out. When measured in this way,  $1\frac{1}{4}$  cups of brown sugar is about equivalent to 1 cup of granulated sugar.

### Baking Powders

Baking powders usually contain sodium bicarbonate and some acid-reacting material, such as cream of tartar, sodium aluminum sulphate, or a phosphate mixed in the proper proportions, with starch to keep the ingredients dry. If baking powder becomes moist before it is used, the soda and the acid start reacting, gas is liberated, and the powder loses some of its leavening power. This is why baking powders should be kept tightly covered and in a dry place.

The commercial powders are classified according to the kind of acid-reacting material used, as tartrate, phosphate, or sodium aluminum sulphate. Some of these materials react more quickly than others, and commercial powders in some cases contain two forms of acid, so that not all of the gas is released at one time. None of the powders on the market, so far as known, are harmful to the body when used in the quantities needed for leavening.

In general, for each cup of flour in a batter or dough 1 to  $1\frac{1}{2}$  teaspoons of baking powder are needed. In cakes containing fat in which a large proportion of egg white is used, this amount may be decreased. In pop-overs and true sponge cakes no baking powder is used.

### Self-Rising Flours

In self-rising flours, salt, soda, and an acid-reacting material are mixed with the flour. Modern machinery makes it possible to weigh out these materials accurately and mix them more thoroughly than can be done at home. Directions accompanying these flours should be followed, and no other leavening agent or salt should be added.

### Soda and Sour Milk or Molasses

Baking soda used with sour milk or molasses acts practically as baking powder acts in leavening a mixture. The soda should be mixed with the flour and other dry ingredients so that it will not begin to act until the liquid is added. Then the viscous mixture will hold in the gas. The old custom of putting the soda into the sour milk or molasses is not good practice, because gas begins to escape as soon as these ingredients are combined.

The rule is half a teaspoon of soda for each cup of sour milk or for a cup of molasses. It is better to use too little soda than too much. An excess gives a disagreeable flavor and odor as well as the typical yellow color. One teaspoon of soda, if there is plenty of acid to react with it, may be considered equivalent in leavening effect to 4 teaspoons of baking powder, because baking powder is about one-fourth soda.

To substitute sour milk and soda for sweet milk and baking powder, use an equal quantity of sour milk and half a teaspoon of soda for each cup of sour milk. This is approximately enough soda to neutralize the acid.

For thin batters the soda and sour milk generally furnish enough leavening, but for thick batters or doughs, baking powder is usually needed in addition. For example, in the proportions for griddlecakes (p. 18) 1 cup of sweet milk and

2 teaspoons of baking powder may be replaced by 1 cup of sour milk and a half teaspoon of soda. This quantity of soda is not only right for the sour milk, but with the milk is about equivalent in leavening power to the 2 teaspoons of baking powder.

For biscuits which call for 1 cup of milk and 4 teaspoons of baking powder, if 1 cup of sour milk and a half teaspoon of soda were substituted, 2 teaspoons of baking powder would be needed also to be equivalent to the above quantity of baking powder.

When sweet milk is used in place of sour, baking powder is substituted for all of the soda in the proportion of 4 teaspoons of baking powder for 1 teaspoon of soda if no other acid ingredient, such as molasses, is used. If such an acid ingredient is used, as molasses in gingerbread, some soda is required.

### MIXING AND BAKING

The flour for batters and doughs is usually from the softer wheats or it is a blend in which the gluten formed is less in quantity and weaker in quality than in hard-wheat flour. In quick breads, since there is no yeast, there is no fermentation to change the character of the gluten; so the method of mixing is especially important in obtaining a good product.

In very thin batters, such as that for pop-overs, timbale cases, and cover batters, the gluten is so dispersed that it must be supplemented by protein from eggs, if it is to form the shell characteristic of these products. The gluten is formed as the mixture is beaten, and the beating is continued until the batter is smooth. Additional beating of such thin batter will not make a tough product.

Thick cover batters, griddlecakes, and waffles should be stirred very little. They contain more flour in proportion to the liquid, and beating may develop the gluten too much and make them tough.

A stiff or drop batter, containing twice as much flour as liquid, is used for fritters and muffins. Here the ingredients should be just mixed and not stirred more than enough to moisten them, or the product will be tough and coarse-grained. Muffins if overmixed, will have tunnels on the inside and peaks or knobs on the outside. These effects are caused by the overdevelopment of the elastic quality of the gluten.

Doughs, which are made soft for biscuit and stiff for pastry, contain more flour in proportion to the liquid than do batters. Solid fat is added directly to the flour before the liquid. The fat is thus distributed between the particles of flour, and this gives a flaky effect in the baked product. If oil or melted fat is used, it should be mixed with the liquid and the combination added to the flour.

Baking brings about important changes in batters and doughs. The heat hastens the action of baking powder or other chemical leavening agent in forming gas. It causes the formation and expansion of water vapor, which aids in leavening. It hardens the proteins, particularly the gluten in flour and the proteins of egg and it cooks the starch and browns the crust.

The main point in baking is to regulate the temperature so that the bread or cake will set as soon as the gases have formed and expanded, and before they have time to escape. The correct baking temperature depends on the kind of leavening, the proportions of ingredients, and the size and shape of the product.

For pop-overs the baking temperature must be high to form the steam necessary for expansion of the batter to form the shell. But this high temperature cannot continue throughout the baking or the outer surface will brown too much before the shell has dried and become rigid and crisp. Timbale cases and cover batters are cooked in deep fat heated to about 370° F. Large compact

masses take longer to heat through than small, flat ones and should therefore be baked more slowly. A large loaf, for example, needs lower temperature and longer baking than a layer. So far as possible these points are considered in giving temperatures in the recipes for each type of baked product.

For most products, if the temperature is right at the start it need not be changed during baking. A reliable oven thermometer or an automatic temperature regulator that has been tested is the surest means of knowing when the temperature is right. Such a thermometer may be bought at relatively low cost and used in any type of oven.

The oven door should be opened only when necessary, and the pan should be moved as little as possible while the mixture is setting. If baked at the right temperature, quick-loaf breads and cakes may generally be considered done when they shrink from the pan, but for safety they may be tested by inserting a clean straw or toothpick, which should come out clean.

### Pop-overs

(8 to 12 pop-overs)

2 eggs, beaten.	1 cup sifted flour.
1 cup milk.	$\frac{1}{2}$ teaspoon salt.
1 tablespoon butter or other fat, melted.	

Combine the beaten eggs, milk, and melted fat. Add the flour and salt and beat with an egg beater until smooth. Pour into hot, greased baking cups, preferably glass, earthenware, iron, or enamelware because they hold the heat, until the cups are not more than half full of batter. Bake at once for 30 minutes in a hot oven (450° F.); then reduce the temperature to moderate (350°) and bake for 15 minutes longer.

### Timbale Cases

(30 medium-sized cases)

1 egg, beaten.	1 cup sifted flour.
$\frac{3}{4}$ cup milk.	$\frac{1}{2}$ teaspoon salt.
1 teaspoon fat, melted.	Fat for frying.

Combine the ingredients as for pop-overs. Let stand for one-half hour or until the bubbles of air have disappeared. Heat the timbale or rosette iron in deep fat at 370° F. Remove the iron and drain off the surplus fat. Dip the hot iron into the batter, nearly to the depth of the iron. (If the batter slips off when the iron is lifted out, the iron is too hot.) Immerse the iron with the batter on it in the hot fat and cook for about one-half minute or until light brown and crisp. Remove from the fat and drain the timbale case on absorbent paper.

### Cover Batters

With the addition of  $1\frac{1}{2}$  teaspoons of baking powder, sifted with the dry ingredients, the timbale batter may be used as a cover batter for frying sliced eggplant, sliced onion rings, shrimp, oysters, scallops, and fish. A somewhat thicker cover batter is used for frying more juicy vegetables or fruits.

In thicker batters, such as griddlecakes and waffles, more flour is added to the liquid, more leavening agent is used to make a porous texture, with sugar and more fat for flavor and tenderness and to give a finer grain to the product. These thicker batters should not be overstirred or beaten, or the gluten will develop too much, and the product will be tough. When the eggs are increased to two, as in waffles, a finer grain and a larger volume are obtained if the whites are beaten and added separately to the batter.

## Griddlecakes

(16 to 24 cakes)

1½ cups sifted flour.  
2 to 2½ teaspoons baking powder.  
¾ teaspoon salt.  
0 to 1 tablespoon sugar.

1 egg, beaten.  
1 cup milk.  
2 tablespoons fat, melted.

Sift the dry ingredients together. Combine the beaten egg, milk, and melted fat. Add gradually to the dry ingredients, stirring only until the batter is smooth. Bake the cakes on a hot griddle.

**Variations.**—One cup of buckwheat flour or finely ground corn meal may be substituted for 1 cup of wheat flour.

Or 1 cup of white flour and one-half cup of whole-wheat flour, or 1½ cups of whole-wheat flour, may be substituted for all the white flour. Or a thinner crisp griddlecake may be made by using less flour—one-half cup each of white and whole-wheat flour, or 1 cup of whole-wheat flour.

## Waffles

(4 waffles)

1½ cups sifted flour.  
2 teaspoons baking powder.  
½ teaspoon salt.  
1 tablespoon sugar.

1 to 2 eggs.  
1 cup milk.  
2 tablespoons fat, melted.

Combine the ingredients as for griddlecakes, except when two eggs are used. In that case fold the beaten egg whites into the batter after all the other ingredients have been mixed. Bake in a waffle iron hot enough to brown the waffle quickly.

## Fritters

2 cups sifted flour.  
3 teaspoons baking powder.  
1 teaspoon salt.  
2 tablespoons sugar.  
2 eggs, beaten.

1 cup milk.  
1 tablespoon fat, melted.  
1 cup fruit or vegetable pulp.  
Fat for frying.

Sift the dry ingredients together. Combine the beaten egg, milk, and melted fat. Add gradually to the dry ingredients, stirring only until the batter is smooth; then add the pulp of a fruit or vegetable and drop the batter by spoonfuls into deep fat heated to 365° to 370° F. Remove when light brown on both sides (about 2 minutes), and drain on absorbent paper. Fruit fritters may be sprinkled with powdered sugar.

This batter is used with vegetables and fruit. To make a cover batter for frying pieces of pineapple, bananas, apples or similar fruits, increase the quantity of milk by one-fourth cup. Dip the pieces of fruit into the batter and fry in the same way as the fritters.

## Muffins

(12 medium-sized muffins)

2 cups sifted flour.  
3 teaspoons baking powder.  
½ teaspoon salt.  
0 to 2 tablespoons sugar.

1 egg, beaten.  
1 cup milk.  
2 to 4 tablespoons fat, melted.

Sift the dry ingredients together. Combine the egg, milk, and melted fat. Add to the dry ingredients all at once; stir just enough to moisten and give the mixture a rough appearance. Fill greased muffin pans two-thirds full. Bake in a hot oven 400° to 425° F. for about 20 minutes.

**Variations.**— $1\frac{1}{3}$  cups of whole-wheat flour, or buckwheat flour, or finely ground corn meal, with two-thirds cup of white flour may be substituted for the 2 cups of white flour. Coarse corn meal should be substituted on the basis of weight.

One cup of fine rolled oats may be substituted for 1 cup of the white flour.

One-half cup of chopped nuts or dried fruit, or one-quarter cup of bits of crisp bacon may be mixed with the dry ingredients of the muffin batter.

One cup of washed and dried blueberries or cranberries may be used if the liquid is reduced to three-fourths of a cup and the sugar and the fat each increased to one-fourth of a cup. Mix the berries with the dry ingredients.

One-third cup of peanut butter or one-half cup of grated cheese may replace the fat to make peanut-butter or cheese muffins.

### Quick Loaf Breads

Quick loaf breads, plain or with nuts or fruit, are made of the richer muffin mixtures baked in a loaf pan. The fruit or nuts should be added to the batter according to the directions for muffins. The oven temperature should be low enough for the bread to expand before a crust forms on top, and to bake through before the crust becomes too hard or brown. For a small or medium loaf a moderate oven ( $350^{\circ}$  F.) is used. A larger loaf requires a lower temperature.

Gingerbread may be made with sweet milk or water and baking powder, or with sour milk and soda. The baking-powder gingerbreads are usually lighter in color and have a different flavor. Since molasses burns easily, the temperature for baking gingerbread is lower than for bread containing sugar.

### Gingerbread

3 cups sifted flour.	$\frac{1}{2}$ teaspoon cloves.
$\frac{1}{2}$ teaspoon soda.	$\frac{1}{2}$ teaspoon cinnamon.
2 teaspoons baking powder.	2 eggs, beaten.
$\frac{1}{2}$ cup sugar.	1 cup milk.
$\frac{1}{2}$ teaspoon salt.	$\frac{1}{2}$ cup fat, melted.
1 teaspoon ginger.	1 cup molasses.

Sift the dry ingredients together. Combine the beaten eggs, milk, and melted fat, and add this mixture to the dry ingredients, stirring in the molasses last. Bake in shallow pans in a moderate oven ( $350^{\circ}$  F.) for 30 to 40 minutes or in muffin pans in a hot oven ( $400^{\circ}$ ) for 20 to 25 minutes. Sour milk with 1 teaspoon of soda and 1 teaspoon of baking powder may replace the sweet milk and the soda and baking powder called for in the recipe.

### Biscuits

Since different flours absorb different quantities of water, it is difficult to give an exact amount of liquid in a biscuit recipe. The dough should be fairly moist at the beginning, because as it is stirred and the gluten forms, it becomes stiffer.

If a soft dough is dropped from a spoon onto a baking sheet, a tender, irregular-shaped drop biscuit will be the result. A tender, crusty biscuit is obtained if the dough is patted out and cut into rounds.

To make biscuit with a large volume and a tender flaky crumb free from yellow or brown specks, the dough should be stirred and then kneaded slightly before rolling. This kneading forms the gluten and makes the dough elastic so that it will stretch to a larger volume. It also distributes and dissolves the baking powder so that the acid will act with the soda in the baking powder rather than on the flour, and thus prevents the brown specks characteristic of undermixed biscuits. Further kneading results in a loss of gas from the dough and over-

develops the gluten making a biscuit of small volume, close grain, and a somewhat tough texture. Biscuits brown more evenly and quickly if they are baked on a baking sheet without sides.

For making 25 medium-sized biscuits, use the following:

3 cups sifted flour.	4 to 6 tablespoons fat.
4 teaspoons baking powder.	Milk to make soft dough (about 1 cup).
1 teaspoon salt.	

Sift the dry ingredients together and cut in the fat with a biscuit cutter. Make a well in the mixture and add the milk slowly, stirring from the center until a soft dough is formed. For drop biscuits drop the dough by spoonfuls on a baking sheet. For cut biscuits place the dough on a lightly floured board and pat out or roll until three-fourths of an inch thick, or knead gently (about 18 strokes) and roll into a sheet three-fourths of an inch thick. Cut into as many biscuits as possible from the first rolling. Place on a baking sheet and bake in a hot oven (450° F.) for about 15 minutes.

**Variations.**—Sour milk may replace the sweet milk, if one-half teaspoon of soda and 2 teaspoons of baking powder are used instead of the 4 teaspoons of baking powder called for in the recipe.

One cup of grated cheese, or one-half cup of grated orange rind, or one-half cup of chopped nuts may be added to the sifted dry ingredients.

For peanut-butter biscuits, decrease the fat one-half and add 4 tablespoons of peanut butter with the fat to the dry ingredients.

### Crust for Meat Pie

Crust for pie is made in the same way as biscuit dough but with more fat. Fat from the meat may be used. The dough is rolled out about one-half inch thick to the proper size for the baking dish, placed on top of the filling, and baked in a hot oven at about 425° F.; that is, at slightly lower temperature than for biscuits. The crust bakes better if the filling is hot at the start.

### Shortcake

Shortcake dough is also similar to that for biscuits except that it contains fat in the proportion of one-half cup to 3 cups of flour, and usually a little sugar. The dough is rolled to one-fourth of an inch in thickness and is usually baked in two layers, one on top of the other, wiped with butter between, so that it will split easily. The oven should be hot (425°F.) for a large sheet or for individual shortcakes.

### Pastry

Pastry differs from biscuit dough in that it contains a higher proportion of fat and less liquid, which makes it very stiff. The solid fat is cut into the flour until the consistency is much like that of coarse corn meal. If the fat is worked in with the fingers, it should be cold, the room cool, and the fat worked in quickly before the warmth of the fingers makes it too soft. In the process the solid particles of fat become coated with flour and when the liquid is added the flour particles stick together to form a dough.

The quantity of water added may make the difference between a good and poor pastry. If too much water is added, the manipulation necessary to shape the dough and roll it out develops the gluten. This makes a sticky dough and a tough baked crust. If just enough water is added, handling the dough has little effect on the toughness of the crust. If too little water is added, there is

not sufficient moisture to bind the particles of flour in baking, and the crust is crumbly rather than flaky. Also there is not enough liquid to form the steam, which with the enclosed air leavens the pastry.

The method of adding water, as well as the quantity, is important. Water should be added in such a way as to distribute it gradually and evenly over the particles of flour and fat. An all-purpose flour is better than a very soft flour for pastry, because the dough it makes is easier to handle and the pastry is more flaky.

### Piecrust

1½ cups sifted flour.  
1 teaspoon salt.

5 to 6 tablespoons fat.  
2½ tablespoons water (variable).

Mix the flour and salt, and work in the fat with the fingertips or with a fork or biscuit cutter until the mixture is granular. Sprinkle some of the water over the surface, combining each dampened part into a dough, then add more water sparingly until the mixture becomes a stiff dough. On a lightly floured board roll out more than half the dough into a thin sheet large enough to line the piepan. Pat the sheet very lightly into the pan to prevent air bubbles remaining underneath.

Put in the pie filling and moisten the rim of the dough. Roll out the dough for the upper crust allowing about a half inch extra around the edge. Fold the sheet of dough in half, make a few slashes through both thicknesses near the center, lift onto the pie and spread out over the filling. Press lightly around the edge of the pan, and if the filling is juicy allow enough dough to fold under well. Lift the pan and trim off the surplus dough, holding the knife slantwise underneath the pan. Crimp with the fingers or with the tines of a fork press the rim lightly to the pan.

If the under crust is baked before the filling is put in, line the piepan with the dough as directed, but in cutting off the surplus dough, leave a generous turnover around the rim. Prick the dough every 2 or 3 inches over the bottom and sides.

Bake in a hot oven (400° F.) for 10 minutes, or until the crust is delicately browned. Using a prebaked crust, custard-type pies are baked for 25 minutes in a moderate oven (350°); fruit pies for 25 to 30 minutes in a moderately hot oven (375° to 400°). Double-crust fruit pies without a prebaked under crust are baked for 25 minutes in a hot oven (425°).

### CAKES, COOKIES, AND DOUGHNUTS

All cakes contain flour and sugar. Most of them contain liquid and leavening. Some of them contain fat; others do not. In a general way they are classified as cakes containing fat and cakes without fat. But cookies and doughnuts, both of which contain fat, have other characteristics that distinguish them.

Fine soft-wheat flour is best for cakes, especially the richer cakes. The liquid is preferably milk. Granulated sugar is preferred to powdered, and a solid fat which can be creamed is better than an oil. Baking powder or soda, and sour milk or soda and molasses are the usual leavening in cakes containing fat. Pound cake, however, has no leavening and no liquid, and the true sponge cakes, which contain no fat, are leavened by air beaten into the eggs.

There are differences in flours, liquids, fats, leavenings, and sugars which must be considered when substitutions are made in a given recipe. For discussion of these differences and the methods of substitution see the sections on quick breads and pastry.



## CAKES CONTAINING FAT

There are four typical recipes for cakes containing fat and many variations of these. The four types differ from each other mainly in the amounts of fat, sugar, and eggs they contain. Plain cake is the least rich in these ingredients. Next in richness comes foundation cake, then rich cake, so-called, and then pound cake, the richest of all. The proportions of ingredients for each of these types and for some of the most important variations are given in table 3.

TABLE 3.—*Ingredients and proportions for typical cakes containing fat*

Cake	Fat	Sugar	Eggs	Flour, soft- wheat, sifted	Baking powder	Salt <sup>1</sup>	Milk	Flavor- ing <sup>2</sup>	Choco- late	Soda
	Cups	Cups		Cups	Tea- spoons	Tea- spoon	Cup	Tea- spoon	Ounces or squares	Tea- spoon
Plain.....	$\frac{1}{4}$	1	1	3	4	$\frac{1}{4}-\frac{1}{2}$	1	$\frac{1}{2}-1$	.....	.....
Foundation.....	$\frac{1}{2}$	$1\frac{1}{2}$	2-3	3	4	$\frac{1}{4}-\frac{1}{2}$	1	$\frac{1}{2}-1$	.....	.....
Chocolate.....	$\frac{3}{8}$	$1\frac{1}{2}$	2-3	$3\frac{2}{8}$	4	$\frac{1}{4}-\frac{1}{2}$	1	$\frac{1}{2}-1$	2	.....
Devil's food.....	$\frac{3}{8}$	$1\frac{1}{2}$	2-3	$3\frac{2}{8}$	2	$\frac{1}{4}-\frac{1}{2}$	1 (sour)	$\frac{1}{2}-1$	2	$\frac{1}{2}$
Rich.....	1	2	4	3	4	$\frac{1}{4}-\frac{1}{2}$	1	$\frac{1}{2}-1$	.....	.....
Chocolate.....	$\frac{7}{8}$	2	4	$3\frac{2}{8}$	4	$\frac{1}{4}-\frac{1}{2}$	1	$\frac{1}{2}-1$	2	.....
Devil's food.....	$\frac{7}{8}$	2	4	$3\frac{2}{8}$	2	$\frac{1}{4}-\frac{1}{2}$	1 (sour)	$\frac{1}{2}-1$	2	$\frac{1}{2}$
Pound.....	$1\frac{1}{4}$	$1\frac{1}{2}$	6	3	.....	$\frac{1}{4}-\frac{1}{2}$	.....	$\frac{1}{2}-1$	.....	.....

<sup>1</sup> Use the smaller quantity with butter or margarine.

<sup>2</sup> Quantity depends on strength of flavoring.

<sup>3</sup> Quantity reduced on account of the chocolate.

The foundation cake is rich enough for most purposes, especially if baked in layers and put together with filling. Both it and the rich cake also may be used as a basis for other types of cake.

For white or yellow cake, whites or yolks of eggs may be used instead of whole eggs, or as an economy in using up parts of eggs left over. For most purposes two whites or two yolks may be considered roughly the equivalent of one egg. When yolks alone are used, a little extra baking powder is sometimes needed, since air cannot be incorporated in the yolks to the extent that it can in the whites.

In chocolate cake, the chocolate may take the place of some fat and flour. One ounce or square of chocolate may be considered the equivalent of about 1 tablespoon of fat and 1 tablespoon of flour.

Devil's food may be made either from foundation cake or rich cake by replacing the sweet milk with sour milk, adding soda, and reducing the quantity of baking powder as indicated in table 3. Make the same substitution of chocolate for fat and flour as for chocolate cake.

## MIXING AND BAKING

As the quantity of sugar, fat, and eggs increases in a cake batter, the proper proportioning of the ingredients becomes more important, careful measuring is essential, and the method of combining has more effect on the baked product.

The object is to build up a stable mixture which will not separate. This is formed best when all the ingredients are at room temperature (70° F.). Then the fat creams more readily, and the egg whites beat more quickly and to a larger volume.

When a fat containing no water is used in the cake (a hydrogenated vegetable fat, for example) it will cream more readily with the sugar if about 2 tablespoons of the liquid is added to it first.

Cakes containing little fat, such as the plain or cottage-pudding type, are really sweetened muffin mixtures, and may be combined just as if for muffins except that the batter is stirred until it is smooth. These cakes are baked either as cupcakes in a moderately hot oven (375° F.) for 20 minutes, or in a thin loaf in a moderate oven (365°) for 25 minutes.

This type of cake is better served hot or while very fresh, because it dries out quickly. It may be made with cream or fruit fillings, or as upside-down cake, or it may be served with a sauce.

The ingredients for foundation cake and rich cake are combined in the following way: Cream the fat until it is soft, add the flavoring and the finely granulated sugar, gradually stirring until the mass increases in volume and becomes light and fluffy, due to the enclosed air. Continue the creaming and slowly add the well-beaten egg yolks. If the egg yolks are added too rapidly the mixture may curdle.

Sift the dry ingredients together and add them alternately with the liquid. The first and last additions should be the dry ingredients. The addition of too much liquid at one time may cause the mixture to separate. Beat in the dry ingredients and stir in the liquid. Then fold in the beaten egg whites. The resulting mixture should be a smooth, fairly thick batter. Pour it into lightly greased pans and bake.

The baking temperature depends on the size of the pans used, the object being to have the volume increase gradually through the expansion of the entrapped air, the vaporized moisture, and the carbon dioxide liberated by the baking powder before the side and top crusts set. The temperatures and times required for baking are: Layer cakes, a moderate oven (365° F.) for 25 minutes. Loaf cakes or those baked in a tube pan, a very moderate oven (325°) for 40 to 45 minutes. Pound cake, a slow oven (300–325°) for an hour or more.

When the pans containing cakes in loaves or layers are taken from the oven they should not be removed from the pan until the cake cools partially and becomes firmer. Cake is too soft and hot for handling when it first comes from the oven. It should be removed from the pan, however, before it reaches room temperature or has a chance to sweat.

### Plain Cake

3 cups sifted soft-wheat flour.  
4 teaspoons baking powder.  
¼ to ½ teaspoon salt.  
1 cup sugar.

1 egg, beaten.  
1 cup milk.  
¼ cup fat, melted.  
½ to 1 teaspoon flavoring.

Sift the dry ingredients together. Combine the beaten egg, milk, melted fat, and flavoring. Add the dry ingredients all at once, stir until the mixture is smooth. Pour into a greased pan, and for a thin loaf, bake in a moderate oven (365° F.) for 25 minutes. As cupcakes, bake in a moderately hot oven (375°) for 20 minutes.

### Foundation Cake and Variations

¼ cup fat.  
¼ to 1 teaspoon flavoring.  
¼ cups sugar.  
2 to 3 eggs.

3 cups sifted soft-wheat flour.  
4 teaspoons baking powder.  
¼ to ½ teaspoon salt.  
1 cup milk.

Cream the fat until soft; add the flavoring and the finely granulated sugar, stirring gradually until the mixture is light and fluffy. Continue creaming and add slowly the well-beaten egg yolks.

Add the sifted dry ingredients and milk alternately, a little milk at a time. Beat in the dry ingredients, stir in the milk. The first and last addition should be the dry ingredients. Fold in the beaten egg whites last of all. Pour the batter into a lightly greased pan.

For a layer cake, bake in a moderate oven (365° F.) for 25 minutes. For a loaf cake, bake in a very moderate oven (325°) for 40 to 45 minutes.

**Variations.**—This recipe with variations may be used for white or yellow cake or for chocolate or for devil's food.

**White cake:** Use four to six egg whites and no yolks, instead of two to three whole eggs.

**Yellow cake:** Use four to six egg yolks and no whites, instead of two to three whole eggs, and add an extra teaspoon of baking powder.

**Chocolate cake:** Use a little less fat than for foundation cake (three-eighths of a cup instead of one-half cup), and less flour (2 $\frac{7}{8}$  cups instead of 3 cups), and add 2 ounces (2 squares) of melted unsweetened chocolate. Melt the chocolate over warm (not boiling) water, and add just before the egg whites are folded into the batter.

**Devil's food:** This is a chocolate cake leavened partly with sour milk and soda. Use the same quantity of fat (three-eighths cup) and of flour (2 $\frac{7}{8}$  cups) as for chocolate cake, with sour milk instead of sweet. Use one-half teaspoon of soda and only 2 teaspoons of baking powder. Other proportions are the same as for chocolate cake.

### Rich Cake and Variations

1 cup fat.	3 cups sifted soft-wheat flour.
$\frac{1}{2}$ to 1 teaspoon flavoring.	4 teaspoons baking powder.
2 cups sugar.	$\frac{1}{4}$ to $\frac{1}{2}$ teaspoon salt.
4 eggs.	1 cup milk.

Mix and bake as directed for foundation cake.

This recipe may also be used as the basis for chocolate and devil's food, as follows:

**Chocolate cake:** Use one-eighth cup less fat (seven-eighths cup instead of 1 cup) and one-eighth cup less flour (2 $\frac{7}{8}$  cups instead of 3 cups), and 2 ounces (2 squares) of melted unsweetened chocolate.

**Devil's food:** Proportions as for chocolate cake, with sour milk instead of sweet, three-eighths teaspoon soda, and only 2 teaspoons of baking powder

### Pound Cake

$\frac{1}{4}$ cups butter.	6 eggs.
$\frac{1}{2}$ teaspoon mace.	3 cups flour.
Grated rind of $\frac{1}{2}$ lemon.	$\frac{1}{4}$ to $\frac{1}{2}$ teaspoon salt.
$1\frac{1}{2}$ cups sugar.	

Cream the butter until soft, add the mace and lemon rind, and then the sugar gradually, stirring until the mixture is light and fluffy. Continue creaming and add slowly the well-beaten egg yolks. Fold in the stiffly beaten egg whites, then add the flour and salt and beat until the batter is smooth. Put the batter in a tube pan which has been lined with wax paper. Bake in a slow oven (300° to 325° F.) for 1 to 1 $\frac{1}{4}$  hours.

In cookies the proportion of flour to liquid is increased over that in cake, so that the mixture has the consistency of a stiff batter or dough. The batter is stiff enough so that it can be dropped on a baking sheet and retain its shape. The stiff dough may be rolled into cookies, or chilled and sliced. If a thin cookie is desired use an oven temperature of 350° instead of 375° F., so that the batter or dough will spread as the fat melts. The thicker cookies should be started in a hot oven so that a crust will form before the fat melts.

### Drop Cookies

$\frac{3}{4}$ cup fat.	4 cups sifted soft-wheat flour.
3 teaspoons flavoring.	4 teaspoons baking powder.
$1\frac{1}{2}$ cups sugar.	$\frac{1}{2}$ teaspoon salt.
2 eggs.	$\frac{3}{4}$ cup milk.

Mix the ingredients as for foundation cake. Drop small portions of the mixture on a greased baking sheet and bake in a moderately hot oven ( $375^{\circ}$  F.) for 15 minutes.

### Crisp Cookies

1 cup fat.	4 cups sifted soft-wheat flour.
2 teaspoons flavoring.	4 teaspoons baking powder.
2 cups sugar.	$\frac{1}{2}$ teaspoon salt.
2 eggs.	$\frac{1}{4}$ cup milk, or less.

Mix the ingredients as for foundation cake. Form the dough into a roll in waxed paper and chill thoroughly. Cut off thin slices from the roll and bake.

For rolled cookies cut off pieces of dough, roll on a lightly floured board to about one-fourth inch in thickness. Cut into any desired shapes and bake the cookies on a greased baking sheet in a moderately hot oven ( $375^{\circ}$  to  $400^{\circ}$  F.) for about 10 minutes.

Doughnuts are small pieces of sweetened spiced dough fried in deep fat. The dough may be made like a cake mixture, or it may be leavened with yeast like bread.

### Plain Doughnuts

1 cup milk.	$4\frac{1}{2}$ cups sifted flour.
1 tablespoon vinegar.	5 teaspoons baking powder.
1 tablespoon fat, melted.	1 teaspoon salt.
2 eggs, beaten.	1 teaspoon cinnamon.
1 cup sugar.	$\frac{1}{2}$ teaspoon nutmeg.

Add the milk, vinegar, and the melted fat to the beaten eggs.. Stir into the sifted dry ingredients until a soft ball is formed. Put on a lightly floured board, knead gently, and roll out to one-third inch thick. Cut out the doughnuts; then fry for about 3 minutes in deep fat at a temperature of  $365^{\circ}$  F. Turn during frying. Drain on absorbent paper. When cool place in a paper bag with powdered sugar and shake well.

Cocoa doughnuts are made by replacing one-fourth cup of flour with one-fourth cup of cocoa.

### Raised Doughnuts

1 cup milk.	$3\frac{1}{2}$ to 4 cups sifted flour.
2 tablespoons fat.	1 egg.
1 cake yeast.	$1\frac{1}{2}$ teaspoons salt.
$\frac{3}{4}$ cup sugar.	$\frac{3}{4}$ teaspoon nutmeg.

Scald the milk, add the fat, and, when lukewarm, add the yeast and sugar. Stir in  $1\frac{1}{2}$  cups flour. Allow the sponge to stand in a warm place until very light. Add the beaten egg and the rest of the flour. The dough should be softer than a bread dough. Cover and set in a warm place to rise. When light, roll from one-half to three-fourths inch thick on a lightly floured board. Cut out the doughnuts. Cover and set in a warm place until almost double in bulk. Fry in deep fat as for other doughnuts, placing the raised side down in the fat

## CAKES WITHOUT FAT

The cakes made without fat are called sponge cake, sunshine cake, and angel food, depending, respectively, on whether the same number of egg yolks and whites, a large proportion of whites, or only whites are used. Eggs supply the liquid in these cakes and serve as a means of adding air for leavening. Lemon juice or cream of tartar is added, because the acid affects the ingredients in such a way as to make the cake more tender, of greater volume, and whiter in the case of the angel food. Fine soft-wheat flour and finely granulated sugar give best results in cakes of this type. The quantities given in table 4 will make one large cake or two medium-sized loaves.

TABLE 4.—Ingredients and proportions for sponge cakes

Ingredient	Sponge cake	Sunshine cake	Angel food
Flour, soft wheat, sifted.	1 cup	1 cup	1 cup.
Eggs	1 cup (4 or 5)	1 cup (6 whites and 3 yolks)	1 cup whites (8 fairly large).
Sugar, fine granulated	1 cup	1 to 1½ cups	1 to 1½ cups.
Salt	½ teaspoon	½ teaspoon	½ teaspoon.
Flavoring and acid	2 tablespoons lemon juice, 1 teaspoon lemon rind, grated.	1 teaspoon flavoring, ¾ tea- spoon cream of tartar.	1 teaspoon flavoring, ¾ tea- spoon cream of tartar.

Because of their delicate texture, sponge cakes require more careful mixing and baking than other types of cake. The eggs should be brought to room temperature before they are beaten in order to obtain a fine-grained cake of largest volume. They should not be beaten too stiff; they still flow slightly when at the right stage. Overbeating of egg whites decreases their elasticity and causes the air cells to break instead of expand during cooking, making a coarse-grained cake.

## Plain Sponge Cake and Variations

1 cup sifted soft-wheat flour.  
1 cup (4 or 5) eggs.  
1 cup sugar.

2 tablespoons lemon juice.  
1 teaspoon lemon rind, grated.  
½ teaspoon salt.

Sift the flour three times. Beat the egg yolks until thick and lemon-colored; gradually add half the sugar, beating thoroughly, and then the lemon juice and rind. Beat until thick. Beat the egg whites and salt until they start to peak but will still flow. (A Dover beater gives satisfactory results, and requires less time and energy than a wire beater.) Fold in the remainder of the sugar to make a meringue. Fold in the flour gently. Pour the batter as soon as it is mixed into an ungreased baking pan. For a large or medium-sized loaf a tube pan is best, because the center opening allows the mixture to heat evenly. Powdered sugar sifted over the top makes a more desirable crust.

The oven should be ready for the cake as soon as it is mixed and in the pan. A large or medium-sized sponge cake should be baked in a slow oven (about 300° F.) for from 50 to 60 minutes. After baking, invert the cake to cool, but remove from the pan before it is entirely cold.

**Variations**—The proportions for sponge cake may be modified by substituting milk or water and baking powder for one or two of the eggs according to the general rule of 2 tablespoons of liquid and one-half teaspoon of baking powder for each egg omitted. In this case sift the leavening with the flour and add the liquid before folding the egg whites into the batter. Cakes of this

kind may be baked at a temperature slightly higher (about 340° F.) than is used for true sponge cakes.

For cocoa sponge cake, replace one-fourth cup of the flour with one-fourth cup of cocoa and 1 tablespoon of the lemon juice with water. Sift the cocoa with the flour.

### Sunshine Cake

1 cup sifted soft-wheat flour.	$\frac{3}{4}$ teaspoon cream of tartar.
1 cup (6 whites and 3 yolks) eggs.	1 teaspoon flavoring.
1 to $1\frac{1}{4}$ cups sugar.	$\frac{1}{2}$ teaspoon salt.

Mix and bake as directed for sponge cake.

### Angel Food and Variations

1 cup sifted soft-wheat flour.	$\frac{1}{2}$ teaspoon salt.
1 to $1\frac{1}{4}$ cups sugar.	$\frac{3}{4}$ teaspoon cream of tartar.
1 cup (8 fairly large) egg whites.	1 teaspoon flavoring.

Of the several methods for combining the ingredients for angel food, the following seems to give the most consistently good results: Sift the flour and half the sugar together several times. Beat the egg whites with the salt until frothy; then add the cream of tartar and beat until the egg foam starts to peak. Fold in the other half of the sugar to form a meringue. Then fold in the flour-sugar mixture gradually and gently, and when the whole is partly blended add the flavoring. Only a gentle folding motion should be used in mixing, for stirring tends to release the air depended on for leavening.

A tube pan is best for baking angel food, and a fairly large cake will require about an hour in an oven at a temperature of 325° F. It may be tested in the same way as any other cake. After baking, invert the cake and remove from the pan when almost cold.

Variations suggested for plain sponge cake may be used for angel food as well.

For cocoa angel food, replace one-fourth cup of the flour with one-fourth cup of cocoa, and sift the cocoa with the flour.

## SCORE CARDS FOR HOME-BAKED PRODUCTS <sup>2</sup>

Score cards are often needed for judging home-baked products at community fairs or demonstrations. They also offer to the homemaker a quick means of checking over the points that make for high quality in the bread, cake, and pastry that she serves on her own table.

### YEAST BREAD

	Points
Standard product . . . . .	100
External characteristics . . . . .	30
Shape—well proportioned, evenly rounded top . . . . .	10
Crust—uniform browning except slightly darker on top, about $\frac{1}{8}$ of an inch deep, crisp, tender, smooth, free from cracks and bulges . . . . .	10
Volume—light in weight in proportion to size . . . . .	10
Internal characteristics . . . . .	40
Texture—tender elastic crumb, free from dryness or doughiness . . . . .	20
Grain—fine cells elongated upward, evenly distributed, cell walls thin . . . . .	10
Color—characteristic of ingredients used, free from dark streaks . . . . .	10
Flavor . . . . .	30
A blend of well-baked ingredients, free from undesirable flavor from bacterial action (sourness) or of yeast or other ingredients . . . . .	30

<sup>2</sup> Prepared by Elizabeth F. Whiteman and Fanny W. Yeatman, Foods and Nutrition Division.

## QUICK LOAF BREADS

	Points
Standard product.....	100
External characteristics.....	30
Shape—well proportioned, evenly rounded or flat top.....	10
Crust—uniform browning, tender, thin with rough surface, and free from cracks.....	10
Volume—light in weight in proportion to size.....	10
Internal characteristics.....	40
Texture—medium fine, moist, tender crumb.....	20
Grain—round even cells, free from tunnels.....	20
Nuts or fruits—well distributed without excessive dryness or sogginess.....	
Flavor.....	30
Blended flavor of well-baked ingredients characteristic of the kind of product.....	30

## MUFFINS

	Points
Standard product.....	100
External characteristics.....	30
Shape—symmetrical, well-rounded top, free from peaks or knobs.....	10
Crust—tender, thin with rough surface, uniform browning.....	10
Volume—light in weight in proportion to size.....	10
Internal characteristics.....	40
Texture—medium fine, moist, tender crumb.....	20
Grain—round, even cells, free from tunnels.....	10
Color—characteristic of the kind of muffin.....	10
Flavor.....	30
Blended flavor of well-baked ingredients.....	30

## BISCUIT

	Points
Standard product.....	100
External characteristics.....	30
Shape—cylindrical, uniform, free from bulges on sides or top.....	10
Crust—uniform browning, free from yellow or brown spots, fairly smooth, tender.....	10
Volume—almost twice the volume of the unbaked.....	10
Internal characteristics.....	40
Texture—medium fine, tender crumb.....	20
Grain—flaky, peeling off in thin strips with fine, even cells.....	10
Color—creamy white, free from brown or yellow spots.....	10
Flavor.....	30
Blended flavor of well-baked ingredients, free from any undesirable flavor from fat, baking powder, or salt.....	30

## CAKES CONTAINING FAT

	Points
Standard product.....	100
External characteristics.....	30
Shape—symmetrical, slightly rounded top, free from cracks or peaks.....	10
Surface.....	10
Unfrosted: Smooth, uniform light brown except where ingredients darken the color.....	
Frosted:	
Consistency—characteristic of kind, creamy, moist, free from stickiness, crystals, or crustiness.....	
Flavor—characteristic of kind, delicate, and pleasing in combination with cake.....	
Distribution, style, and color—suitable to kind of cake and frosting.....	
Volume—light in weight in proportion to size.....	10
Internal characteristics.....	40
Texture—tender, moist crumb, velvety feel to the tongue.....	20
Grain—fine, round, evenly distributed cells with thin cell walls; free from tunnels.....	10
Color—uniform, characteristic of the kind of cake.....	10
Flavor.....	30
Blended flavor of ingredients. Free from undesirable flavor from fat, leavening, flavoring, or other ingredients.....	30

## HOMEMADE BREAD, CAKE, AND PASTRY

### CAKES WITHOUT FAT (SPONGE)

	Points
Standard product.....	100
External characteristics.....	30
Shape—symmetrical, level top.....	10
Surface.....	10
Unfrosted: Smooth, uniform light brown.	
Frosted:	
Consistency—characteristic of kind, creamy, moist, free from stickiness, crystals, or crustiness.	
Flavor—characteristic of kind, delicate, and pleasing in combination with cake.	
Distribution, style, and color—suitable to kind of cake and frosting.	
Volume—lightweight in proportion to size.....	10
Internal characteristics.....	40
Texture—tender, feathery, resilient crumb.....	20
Grain—fine, round, evenly distributed cells with thin cell walls; free from tunnels.....	10
Color—uniform, characteristic of the kind of cake.....	10
Flavor.....	30
Delicate, free from excessive flavor of egg, flavoring, or acid.....	30

### COOKIES

	Points
Standard product.....	100
External characteristics.....	30
Shape—regular, even.....	15
Crust—color uniform, characteristic of the kind.....	15
Internal characteristics.....	40
Texture.....	20
Thin cookies—crisp, tender.	
Drop cookies—soft, tender.	
Grain—even cells.....	10
Color—characteristic of the kind.....	10
Flavor.....	30
Blended flavor of well-baked ingredients, characteristic of the kind; free from excessive flavor of spices, flavoring, or molasses or other sweetening.....	30

### PIES

	Points
Standard product.....	100
External characteristics.....	30
Shape—regular, free from bulges on top.....	10
Surface.....	20
Crust—uniform browning.	
No meringue—smooth, free from cracks.	
Meringue—slightly browned, light and moist in appearance, adhering to crust around edge of pie.	
Internal characteristics.....	40
Crust.....	20
Texture—tender but free from tendency to crumble, crisp on the bottom as well as along edges.	
Grain—flaky, surface rough, almost blistered in appearance.	
Filling.....	20
Fruit—well cooked, neither too dry nor too juicy.	
Custard—tender and quivery; keeps angles when cut and does not weep on standing.	
Cream—smooth; stiff enough to prevent running when cut but free from pastiness or rubberiness.	
Flavor.....	30
Crust—rich, blended flavor of well-baked ingredients.....	15
Filling—characteristic of the kind, free from excessive sweetness or flavor of uncooked starch.....	15



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